CLAIMS

What is claimed is:

1. A phyllosilicate-polymer composition comprising:

(a) a phyllosilicate; and

(b) a polymer layer adsorbed onto the basal surface of the phyllosilicate providing a phyllosilicate-polymer composition, wherein the phyllosilicate-polymer composition is present as a single phyllosilicate-polymer phase and the phyllosilicate-polymer composition exhibits an anomalous basal spacing.

2. The phyllosilicate-polymer composition of claim 1 wherein the polymer has at least one hydroxyl group.

3. The phyllosilicate-polymer composition of claim 1 further comprising a second polymer layer adsorbed onto the basal surface of the phyllosilicate.

4. The phyllosilicate-polymer composition of claim 2 wherein the polymer is selected from the group consisting of polyethylene glycol, polypropylene glycol and monoalkyl ether derivatives thereof.

5. The phyllosilicate-polymer composition of claim 2 wherein the polymer comprises greater than 27 weight percent of the phyllosilicate-polymer composition.

6. The phyllosilicate-polymer composition of claim 2 wherein the exchange sites on the basal surface of the phyllosilicate is bound substantially with hydrogen ions.

7. The phyllosilicate-polymer composition of claim 2 wherein the basal spacing of the phyllosilicate-polymer composition increases as the molecular weight of the polymer increases.

8. An anisotropic liquid crystalline composite, comprising:

(a) a phyllosilicate-polymer composite, comprising;

(1) a phyllosilicate; and

(2) a polymer adsorbed onto the phyllosilicate,

wherein the phyllosilicate-polymer composite is birefringent.

9. The anisotropic liquid crystalline composite of claim 8 wherein the phyllosilicate is nematically oriented in the phyllosilicate-polymer composition.

10. The anisotropic liquid crystalline composite of claim 8 wherein the phyllosilicate comprises more than 10 percent of the phyllosilicate-polymer composite.

11. The anisotropic liquid crystalline composite of claim 8 wherein the phyllosilicate is selected from the group consisting of kaolins, talcs and montmorillonites.

12. The anisotropic liquid crystalline composite of claim 8 wherein the polymer is water soluble.

13. The anisotropic liquid crystalline composite of claim 8 further comprising a material selected from the group consisting of polyethylene glycol based surfactants and polypropylene glycol based surfactants.

14. The anisotropic liquid crystalline composite of claim 13 further comprising an antioxidant.

15. The anisotropic liquid crystalline composite of claim 13 wherein the liquid crystalline composite is extrudable.

16. The anisotropic liquid crystalline composite of claim 8 wherein the phyllosilicate-polymer composition comprises a barrier layer, the barrier layer providing a gas permeability below a gas permeability of the polymer alone.

17. A method for producing an anisotropic liquid crystalline composite from a phyllosilicate and a polymer comprising:

(a) suspending a phyllosilicate in a compatible solvent;

(b) dissolving a polymer that is soluble in the compatible solvent in the compatible solvent; and

(c) removing a sufficient amount of the compatible solvent to produce an anisotropic liquid crystalline composite.

18. The method of claim 17 wherein the compatible solvent is water.

19. The method of claim 18 wherein the polymer is polyethylene glycol.

20. The method of claim 18 wherein the anisotropic liquid crystalline composite comprises less than about two percent water by weight.

21. The method of claim 18 further comprising purifying the phyllosilicate prior to suspending the phyllosilicate in the compatible solvent.

22. The method of claim 18 wherein the anisotropic liquid crystalline composition comprises between about 30 and 70 percent phyllosilicate.

23. The method of claim 18 further comprising adding a polypropylene glycol or polyethylene glycol based surfactant to the compatible solvent.

24. The method of claim 23 further comprising extruding the anisotropic liquid crystalline composite to produce a barrier layer of the anisotropic liquid crystalline composite.

25. A barrier film for use in packaging and coating applications having reduced gas permeability comprising an anisotropic liquid crystalline composite layer having a gas permeability below the gas permeability of a polymer in the liquid crystalline composite.

26. The barrier film of claim 25 wherein the film is transparent.

27. The barrier film of claim 25 wherein the liquid crystal composite comprises a phyllosilicate and a polymer.

28. The barrier film of claim 27 wherein the phyllosilicate comprises greater than ten percent by weight of the liquid crystalline composite layer.

29. The barrier film of claim 28 wherein the phyllosilicate comprises between about 30 and about 70 percent by weight of the liquid crystalline composite layer.

30. The barrier film of claim 25 wherein the liquid crystalline composite layer comprises an inner layer of a multilayer film.

31. The barrier film of claim 25 wherein the liquid crystalline composite layer further comprises a polyethylene glycol based surfactant.